Aadya Arora
Junior Undergraduate
Electrical Engineering and Minors in Artificial Intelligence
Indian Institute of Technology Gandhinagar

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ACADEMIC DETAILS

Degree	Specialization	Institute	Year	CPI/%
B.Tech.	*Electrical Engineering*	IIT Gandhinagar	2022-Present	8.4(10)
Class XII	*Physics, Chemistry, Maths*	Delhi Public School R.K. Puram, New Delhi	2020-2022	94
Class X		Holy Child School, New Delhi	2018-2020	97

INTERNSHIPS

- **Open Vocabulary Few Shot Referal Image Segmentation | Summer Internship** [May '24 - Ongoing]
  (Advisor - Professor Vinay Namboodiri, University Of Bath, United Kingdom)
  - Implemeting different kinds of adapter with the HIPIE (NeurIPs'23) to meticulously partition images into meaningful semantic regions driven by diverse and arbitrary text descriptions.
  - Achieved a oMIoU score of 85.148 (+2 than state-of-the-art) on RefCOCO and RefCOCO+.
  - Conducted in-depth investigations into the application of visual prompts to substantially enhance segmentation capabilities on complex and challenging datasets, showcasing the robustness of the developed methodologies.
- **CLIP-SAM Hybrid Encoder for Image Classification | Summer Internship** [May '24 - Ongoing]
  (Advisor - Professor Vinay Namboodiri, University Of Bath, United Kingdom)
  - Developed a CLIP-SAM hybrid encoding model integrating CLIP's text-image embeddings with SAM's segmentation capabilities to enhance image classification accuracy across CIFAR-10, CIFAR-100, and Flower-102 datasets.
  - Implemented a novel fusion mechanism combining RGB images and segmented masks, achieving superior performance over traditional linear probes in benchmark tests.
- **Advancing Autonomous Driving Systems for Indian Roads: Comprehensive Solutions for Uncommon Scenarios and Corner Cases | Winter Internship** [Dec '23 - Jan' 24]
  (Advisor - Prof. CV Jawahar, IIIT Hyderabad and Prof. Vineeth N. Balusubramaniam, IIT Hyderabad)
  - Engineered robust solutions to significantly bolster the reliability and performance of autonomous driving systems amidst the multifaceted and often unpredictable nature of Indian road environments.
  - Crafted a comprehensive pipeline utilizing a rich variety of Indian driving datasets, effectively addressing and surmounting the inherent limitations faced by deep-learning-based object detection algorithms.

PROJECTS

- **Shadow Detection and Removal in Images** [Jan '24 - Ongoing]
  (Advisor - Professor Shanmughanathan Raman, IIT Gandhinagar)
  - Achieved state-of-the-art performance in shadow segmentation with 1.3 BER on ISTD dataset, using SAM backbone enhanced with adapter and wavelet features. Currently optimizing model through distillation techniques.
  - Developed a transformer-based shadow removal network that achieved state-of-the-art results on the DESOBA dataset, with a 36.7 PSNR score, improving upon the previous best model ShadowFormer (2023) which had 36 PSNR. Enhanced performance by incorporating priors from a masked autoencoder (MAE).
- **NextCharacterPredictor** [March '24 - April'24]
  (Advisor - Professor Nipun Batra, IIT Gandhinagar) | GitHub
  - Developed an MLP-based next character prediction model trained on several famous corpora.
  - Experimented with varying embedding dimensions and model architecture sizes to optimize prediction accuracy.
- **Human Activity Recognition (HAR)** [Jan'24 - Feb'24]
  (Advisor - Professor Nipun Batra, IIT Gandhinagar) | GitHub
  - Utilized the UCI-HAR dataset comprising time-series data capturing activities of thirty subjects.
  - Successfully classified six different activities: walking, sitting, standing, running up, running straight, and running down.
  - Implemented advanced preprocessing and feature extraction techniques to improve classification accuracy.
- **FPGA Implementation of a Complete Processor Design** [March '24 - April '24]
  (Advisor - Professor Joycee Mekie, IIT Gandhinagar) | Link
  - Designed an 8-bit, 16-register file processor using Verilog, supporting arithmetic, logic, and branch instructions.
  - Synthesized and implemented the design on a Basys3 board, testing with complex programs.
  - Optimized the processor architecture for efficient hardware resource utilization.
- **Fuzzy Logic based Android Application** [Aug '23 - Sept '23]
  (Advisor - Professor Nithin V. George, IIT Gandhinagar) | Link
  - Designed and deployed a fuzzy logic-based Android app to detect falls using accelerometer data.
  - Implemented a fuzzy system using accelerometer and sound levels to assess danger levels.
  - Triggered alerts to transmit sound and GPS data to another phone in case of high danger.

- **Data Narrative: Exploring and Analyzing Datasets** [Jan '23 - April '23]
  (Advisor - Professor Shanmughanathan Raman, IIT Gandhinagar) | GitHub
  - Conducted statistical analysis on multiple probability distributions, optimizing parameters and visualizing data trends.
  - Computed key statistical measures to extract actionable insights from various datasets.
  - Crafted comprehensive data narratives exploring scientific questions and hypotheses using Python libraries.
- **EPCOT: Evaporative Peltier Cooling Tent** [May '23 - June '23]
  (Advisor - Professor Udit Bhatia, IIT Gandhinagar) | Link
  - Successfully integrated Peltier Module cooling with traditional evaporation-based methods.
  - Achieved optimal balance between efficiency and sustainability for humidity and temperature regulation.
  - Designed and tested the cooling model to ensure practical applicability in real-life scenarios.
- **Mangalyaan Propellant Consumption Analysis Using Numerical Methods** [Aug '23 - Sept '23]
  (Advisor - Prof. Dilip Shrinivas Sundaram and Prof. Akshaa Vatwani , IIT Gandhinagar) | Link
  - Conducted detailed analysis of propellant consumption for ISRO's Mars Mission, Mangalyaan.
  - Employed numerical techniques, including Euler's method and Runge-Kutta method, for precise simulations.
  - Iteratively determined propellant mass for each maneuver, ensuring accuracy in simulations.

TECHNICAL SKILLS

- **Programming Languages:** Python, C.
- **Tools:** MATLAB, Autodesk Inventor, Jupyter Notebook, spyder, various python libraries like numpy, scipy, matplotlib, seaborn and pandas.

RELEVANT COURSES

- **Ongoing Courses:** Computer Vision, Digital Signal Processing.
- **Completed Courses:** Machine Learning, Data Centric Computing, Probability, Statistics and Data Visualization, Linear Algebra and Single Variable Calculus, Data Structures and Algorithms, Machine Learning, Signal Systems and Random Processes, Control Systems.

ACHIEVEMENTS

- Secured **All India Rank 9406** in JEE(Advanced)-2022 out of 1.4 million aspirants.
- Secured a position in **KVPY(SX)** Extended List in 2022.
- Nominated for **Best Poster Award at UG Research Showcase at IITGN** in 4th Semester.
- Represented Delhi in **State-Level Handball**.
- Awarded with **Silver Medal** at **Delhi Public School R.K. Puram** for outstanding academic showcase.
- School Topper at **Holy Child School, Tagore Garden.**
- Obtained Teaching Certification at IITGN.

POSITIONS OF RESPONSIBILITY

- **Coordinator For Career Exposure and Guidance** (Professional Development Council, IITGN) [Aug '24 - Ongoing]
  - Coordinating and conducting various activities and events for the career guidance and professional development of students of IITGn
- **Student Guide** (Student Support Services, IIT Gandhinagar) [Aug '23 - April '24]
  - A team driven by a dedicated team of faculty members who offer assistance to students with a broad range of concerns.
- **General Member** (Professional Development Council, IIT Gandhinagar) [Aug '23 - April'24]
  - Provides the student body with a structured framework for their overall professional development
- **Public Relation Executive, Blithchron** (Annual Cultural Fest - IITGN) [Nov '23 - Mar' 24]
  - Contacting and maintaining relations with numerous companies for sponsorship.
- **Design Executive, Blithchron** (Annual Cultural Fest - IITGN) [Nov '22 - Feb' 23]
  - Creating posters and various social media posts using Adobe Illustrator, Canva and other designing softwares.

EXTRA-CURRICULAR ACTIVITIES

- Inter-IIT Aquatics 2024: Representing IITGN